



DLA-96-P60110

**BID EVALUATION MODEL (BEM)
ENHANCEMENTS
DESTINATION UNLOADING COST FACTORS**

SEPTEMBER 1996

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INSIGHT THROUGH ANALYSIS

DORO

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DLA-96-P60110

**BID EVALUATION MODEL (BEM)
ENHANCEMENTS
DESTINATION UNLOADING COST FACTORS**

SEPTEMBER 1996

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FOREWORD

This report documents a study of bulk fuel destination unloading costs at nine military installations. The purpose of this study was to provide the Defense Fuels Supply Center (DFSC) with better information on the costs incurred by its customers to receive bulk fuels. To meet this objective, it was necessary to visit customer locations, observe the receiving process(es) at each location and interview subject matter experts. This report provides the average per gallon bulk fuel receipt costs observed for four modes of receipt: pipeline, tank truck, rail car and barge.

We would like to thank Mr. Robert Short of DFSC for his overall guidance and for assisting us with establishing points of contact (POC) and arranging site visits to the installations included in this study. We would also like to acknowledge the assistance of our installation POCs. Those individuals, who are identified in Appendix A of this report, were invaluable to us in the identification of process tasks and the collection of the process time and cost data required for this study.

Dennis Hepburn
for HAROLD BANKIRER
Colonel, U.S. Army
Chief, DLA Operations Research Office

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EXECUTIVE SUMMARY

The primary objective of this study effort was to provide the Defense Fuels Supply Center with better information on the costs incurred by its customers to receive bulk fuels. To meet this objective, it was necessary to visit customer locations, observe the receiving process(es) at each location and interview subject matter experts. This report provides the average per gallon bulk fuel receipt costs observed for four modes of receipt: pipeline, tank truck, rail car and barge. These costs were obtained from site visits to nine military installations. Three Naval Air Stations and six Air Force Bases were studied.

The most common delivery modes at installations are pipeline and tank truck, and many have both capabilities. In this study, six installations had both capabilities. Because of the prevalence of the pipeline and truck combination, it is likely that DFSC will often evaluate competing bids for the same installation from both pipeline and tank truck providers. This study indicates that, on average, the award of a contract to a vendor who supplies by tank truck will increase the cost of bulk fuel receipt processing by about \$.00100 (100 mils) per gallon over the cost for receiving by pipeline. However, the limited number of installations sampled and the sample variance observed means that we can only be 50% confident that the actual added cost to change from pipeline to tank truck is no more than 25% above (or below) 100 mils.

Despite special efforts, only anecdotal data was obtained on non-labor costs associated with bulk fuel receiving. Accordingly, non-labor costs are assumed to be insignificant and are not included in any cost factors developed during this analysis.

As part of this study, a Manpower Model used by the Air Force to develop bulk fuel processing manpower requirements was reviewed. Documentation provided does not explain the derivation of regression equations employed in the model nor does it explain the source or derivation of the many variances applied by the model. The model does not distinguish between the functions of "receiving" and "issuing" fuel. However, when the marginal effects of a change in "receiving" tasks are evaluated, the model results appear to overstate bulk fuel receiving manpower requirements.

The data base developed for this study should be updated no less than every two years, and cost of living adjustments should be applied to the cost factors. In order to improve the level of statistical confidence in study findings, additional installations should be added to the data base using cost information developed from on-site visits.

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SECTION 1 BACKGROUND

1. BACKGROUND

Military installations receive bulk fuel via several modes of delivery (i.e., pipeline, truck, rail and barge). The most common delivery modes are pipeline and truck, and many installations have both capabilities. Because there is a widely held perception that truck and rail deliveries are more costly to receiving activities than pipeline or barge deliveries, the Defense Fuels Supply Center (DFSC) desires to evaluate these end-user costs (referred to as destination unloading costs). Currently, the DFSC Bid Evaluation Model (BEM) optimizes bulk fuel awards based on an algorithm which minimizes DFSC costs only.

The BEM considers both the bid price of the bulk fuel at Free on Board (FOB) origin as well as DFSC's transportation costs from source to destination. Although the model has the capability to include destination unloading costs in its evaluations, those costs have never been determined, resulting in the potential for non-optimal award decisions. DFSC now desires to determine those costs, expressed as cost per gallon, and then load them into the BEM according to product type, mode of transportation and customer location. These cost factors must reflect costs incurred by customers who receive bulk fuel shipments, regardless of source, by various transportation modes. To develop these factors, all destination unloading tasks, activities, and associated costs must be identified.

Also related to this issue are those contracts which are awarded, from time to time, due to small business set-aside requirements or other socio-economic considerations. If such awards result in added destination unloading costs to customers, DFSC may desire to provide appropriate compensation to its customers for those added costs. In order to satisfactorily negotiate this compensation, DFSC must have better information regarding the true cost differential between the selected receipt mode and the optimal receipt mode for the customer. There have been problems in the past in agreeing on the amount of the difference. In the past, for example, the Air Force has based its requests for additional resources on a manpower model which seems, from DFSC's review, to overstate the differences when comparing pipeline to truck deliveries.

SECTION 2

OBJECTIVES AND SCOPE

2. OBJECTIVES AND SCOPE

2.1 Objectives of Project

The overall objectives of this project are as follows:

- 2.1.1 Review the United States Air Force (USAF) Manpower Model and related standards for destination unloading of bulk fuel deliveries.
- 2.1.2 Conduct site visits to military service installations receiving bulk fuels.
- 2.1.3 Identify destination unloading activities for each receipt mode available for each site visited.
- 2.1.4 Develop costs for each destination unloading activity.
- 2.1.5 Analyze and evaluate collected activity and activity cost data.
- 2.1.6 Develop destination unloading cost factors for each delivery mode for each site, in a form that can be easily used by the BEM.
- 2.1.7 Provide a recommended procedure for updating costs and for projecting cost factors to other sites.

2.2 Scope of this Report

This report is limited to the analysis of destination unloading costs for the bulk fuel categories identified as JP-5 and JP-8. Cost factors were developed for tank truck, pipeline, rail car and barge deliveries. Costs were obtained from the military installations visited.

SECTION 3 STUDY METHODOLOGY

3. STUDY METHODOLOGY

3.1 Review of Air Force Model

One objective of this study was to review the United States Air Force (USAF) Manpower Model and related standards used for the determination of bulk fuel personnel resource requirements. The project analysts met with Headquarters, Air Combat Command (ACC), USAF personnel on 14 March 1996 at Langley Air Force Base, Hampton, Virginia. DORO project analysts discussed the inputs, outputs and uses of the model (technically referred to as the USAF Manpower Standard) and obtained a copy. Subsequent to this meeting, the project analysts examined the model in detail and contacted individuals who were involved with the initial development of the model.

3.2 Site Visits

The primary focus of this study was the identification of all major destination unloading activities associated with each mode of receipt. These activities were identified as a result of site visits to the following military installations:

NAS Cecil Field, FL
NAS Lemoore, CA
NAS Dallas, TX
Eglin AFB, FL
Ellsworth AFB, SD
Tinker AFB, OK
McConnell AFB, KS
Pope AFB, NC
Seymour Johnson AFB, NC

A summary of these site visits, which took place between March and August 1996, is provided at Appendix A of this report. During each site visit, the project analysts talked with subject matter experts to identify required tasks and determine the times required to complete all tasks. At all installations, the project analysts were also able to personally observe the receipt of bulk fuel by one or more receipt modes.

Exhibit I, page 4, shows an example of the type of information obtained at each installation for each applicable mode of bulk fuel receipt. Each task that was performed was identified and the required number of minutes were determined. Based on the rank

or pay grade of the personnel who typically performed these tasks, activity costs were then computed. Cost per gallon statistics were computed by accumulating weekly activity costs and dividing by the average weekly fuel receipts at each base. Appendix B provides a summary of the actual data collected for each military installation. Air Force, Navy and overall average cost factors were computed by taking a weighted (by fuel consumption) average of bases within each group.

EXHIBIT I

EXAMPLE OF DATA COLLECTED AT EACH INSTALLATION FOR BULK FUEL RECEIPT TASKS (THIS EXAMPLE IS FOR TANK TRUCKS AT McCONNELL AFB, KS)

TASK	MINUTES	COST
	(Per Week)	(Per Week)
SOUNDING/GAUGING	60	\$ 21.00
INSPECTIONS	800	\$ 280.00
HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	320	\$ 112.00
SAMPLING & LAB WORK	435	\$ 152.25
BOOKKEEPING	600	\$ 246.00
SAFETY	90	\$ 31.50
SUPERVISION	608	\$ 285.53
OTHER	400	\$ 140.00
TOTAL	3313	\$1268.28

SECTION 4 ANALYSIS

4. ANALYSIS

4.1 Analysis of the Air Force Manpower Model

4.1.1 Computations

The Air Force Manpower Model computes a total manpower requirement for bulk fuel receiving and issuing in the following manner:

- First, the total number and types of aircraft assigned to the installation are used to compute an aircraft equivalence or Primary Authorized Aircraft (PAA) factor.
- Next, a regression equation is used to compute a core manpower requirement; for most bases, the size of the PAA determines which equation is used:

$$\text{If PAA} \leq 140, \text{ then } Y = 22 + .45X$$

however,

$$\text{If PAA} > 140, \text{ then } Y = 71 + .10X$$

where Y is the core manpower requirement and
X is the PAA or equivalent aircraft.

- Next, three major variances are applied to adjust the core manpower requirement upward or downward. These account for differing volumes of fuel received (Variance 1), differences in modes of issuing fuel (Variance 2) and differences in fuel receiving modes (Variance 3). For example, the model's core manpower requirement assumes that each base receives 85% of its bulk fuel by pipeline and the remaining 15% via tank truck (or rail car). Subsequently, Variance 3 increases (or decreases) the manpower requirement as the percentage of fuel received by tank truck (or rail car) varies above (or below) 15%.

- After the three major variances are applied, a set of minor variances are applied, as appropriate, to account for unique missions or characteristics of certain installations. These variances, which typically consist of an add-on of a certain amount of man-hours, are provided for such additional tasks as snow removal, water removal, working in sub-zero temperatures and special testing. There is also a special add-on variance for those installations which off-load fuel from tankers or barges.
- Certain Air Force bases do not use either of the two regression equations shown above. Andersen AB, Edwards AFB, Hickam AFB, Incirlik AB, Keesler AFB, Lajes AFB, March AFB, Mildenhall AB, and Yokata AB use the following equation:

$$Y = X / (.01045 + .01003X)$$

Additionally, Variances 1, 2 and 3 do not apply to these nine locations, although many of the minor variances do apply.

4.1.2 Observations and Concerns

Based upon a detailed examination of the Air Force Manpower Model, the following comments are offered:

- The model assumes that an Air Force Fuel Flight's normal hours of operation are 24 hours per day, 7 days per week. Based upon our site visits to six USAF bases, it is true that issuing of fuel occurs 24 hours per day, but bulk fuel receipt normally occurs between 0800 and 1600 hours, Monday through Friday.
- Documentation provided to the project analysts at the time a copy of the Manpower Model was obtained does not explain the derivation of the regression equations employed in the model nor does it explain the source or derivation of the many variances applied by the model. Subsequent to their visit to Langley Air Force Base, the project analysts contacted individuals who were involved with the initial development of the model in an effort to obtain this documentation. Those efforts, however, proved to be unsuccessful.
- The model computes each Air Force Base Fuel Flight's total manpower requirement and does not distinguish between the functions of "receiving" and "issuing" fuel. However, the marginal effects of a change in "receiving" tasks can be evaluated. Accordingly, the model was tested by varying the amounts of fuel received by tank truck (versus pipeline) from 0% to 100%. The model computed new manpower

requirements for the changed delivery mode which range from a minimum of 6 additional people to a maximum of 13 additional people, depending on the size of the base. Since there is no reason to believe that changing the receipt mode would affect the issuing of fuel, it must be assumed that the additional manpower requirement computed by the model is allocated to the "receiving" function only. Since this additional requirement is not consistent with the task data collected by the project analysts or their actual on-site observations, it must be concluded that the model overstates bulk fuel receiving manpower requirements.

4.2 Labor Costs

Table 1, provides the average per gallon bulk fuel receipt costs obtained during this study of nine installations (3 Navy and 6 Air Force) for pipeline, tank truck, rail car and barge. Averages were computed by weighting each base by its fuel consumption.

Table 1
Per Gallon Bulk Fuel Receipt Costs

	Navy	Air Force	Average
Pipeline	\$0.0012	\$0.0013	\$0.0013
Tank Truck	\$0.0022	\$0.0022	\$0.0022
Rail Car	\$0.0011	\$0.0017	\$0.0016
Barge	NA	\$0.0005	\$0.0005

Data collected on total gallons required per week, total cost per week, and cost per gallon are provided, by installation, at Appendix C.

From Table 1 it can be seen that the average per gallon tank truck receipt cost, for the Navy installations studied, is identical to the average cost for the Air Force installations studied. Similarly, the average pipeline receiving costs are remarkably close for those Navy and Air Force installations studied. More variation exists in the rail car costs observed; however, only three installations (one Navy and two Air Force) with rail car

receipt capability were included in this analysis. The lowest cost mode of bulk fuel receipt observed during this study was barge. However, only one installation included in the analysis (Eglin AFB) had the capability to receive barges.

As noted previously in this report, the most common delivery modes, at all installations, are pipeline and truck, and many bases have both capabilities. Because of the prevalence of this combination of capabilities, it is likely that DFSC will frequently be required to evaluate competing bids in a scenario where Supplier A proposes to deliver bulk fuel to Base X via tank truck while Supplier B proposes to deliver this fuel to Base X via pipeline. If the fuel costs for Supplier A and Supplier B are equal, then the difference in destination unloading costs may become the deciding factor in this award decision. From our analysis, it appears that, on average, the award of a contract to a vendor who supplies by tank truck will cause the cost of bulk fuel receipt processing to exceed the cost of pipeline receipt by about \$.00100 (100 mils) per gallon. If that is the case, and Base X consumed an average of 800,000 gallons per week (4.16 million gallons per year), then changing Base X from pipeline to tank truck would add \$41,600 per year to the cost of receiving this fuel.

The major weakness in this analysis results from the limited number of installations studied and the variance in per gallon receiving costs that was observed between these installations. The limited number of installations resulted from the client's desire to have results by the end of this fiscal year. The variance observed was attributable, perhaps, to the fact that the task times obtained (and thus the costs developed) were not actual measurements but were estimates provided by subject matter experts. However, there was also a wide variation in the age and capabilities of facilities and equipment employed in bulk fuel receiving. Consequently, as explained in more detail in Appendix D, the sample size studied and sample variance observed, in our example, mean that we can only be 50% confident that the actual added cost to Base X is no more than 25% above (or below) \$41,600.

4.3 Non-labor Costs

At every installation visited, the importance of documenting non-labor costs (e.g., supplies, electricity) as well as labor costs was emphasized by the project analysts. It was further noted that, of particular interest, were those costs which may vary by delivery mode. Despite these special entreaties, however, only anecdotal data was obtained on non-labor costs, and that data is provided at Appendix E. Accordingly, non-labor costs associated with bulk fuel destination unloading activities are assumed to be insignificant and are not included in any cost factors developed during this analysis.

Caution should be exercised in applying the results of this study of three Naval Air Stations and six Air Force Bases to other military installations. Insufficient data was obtained to draw any statistically significant conclusions regarding changing from a rail car or barge receipt mode to any other method of receipt. Also, as noted previously, the sample size studied and sample variance observed, in our study, mean that we can only be 50% confident that the actual differential between tank truck and pipeline receipt methods is no more than 25% above (or below) the average difference we observed in our study.

We believe that before the cost factors for tank truck and pipeline are applied to any other installation, a telephone survey should be made of that installation to ensure that there is nothing unusual or unique about that installation's bulk fuel receipt policies, procedures or facilities which would imply that these cost factors were not appropriate.

We further believe that the data base developed for this study should be updated no less than every two years. Although telephone surveys are the preferable method of updating these costs of those installations included in this study, at a minimum, cost of living adjustments should be applied to the cost factors. Periodically, to improve the confidence level of the bulk fuel receiving cost factors, additional installations should be added to the data base using cost information developed from on-site visits.

SECTION 5 SUMMARY OF FINDINGS

5. SUMMARY OF FINDINGS

This report provides the average per gallon bulk fuel receipt costs for pipeline, tank truck, rail car and barge obtained during a study of nine installations. Three Naval Air Stations and six Air Force Bases were studied.

Analysis of the study data shows that the average per gallon tank truck receipt cost, for the Navy installations studied, is identical to the average cost for the Air Force installations studied. Similarly, the average pipeline receiving costs are remarkably close for those Navy and Air Force installations studied. More variation exists in the rail car and barge receipt costs observed; however, only three of the installations studied had rail car receiving capability and only one installation was capable of receiving by barge.

The most common delivery modes observed were pipeline and tank truck, and six installations had both capabilities. From our analysis, it appears that, on average, the award of a contract to a vendor who supplies by tank truck will cause the cost of bulk fuel receipt processing to exceed the cost of pipeline receipt by about \$.00100 (100 mils) per gallon. However, caution should be exercised in applying this sample average to other military installations. The limited number of installations sampled and the sample variance observed means that we can only be 50% confident that the actual added cost to change from pipeline to tank truck is no more than 25% above (or below) 100 mils.

The data base developed for this study should be updated no less than every two years. At a minimum, cost of living adjustments should be applied to the cost factors. Periodically, additional installations should be added to the data base using cost information developed from on-site visits.

Despite special efforts, only anecdotal data was obtained on non-labor costs associated with bulk fuel receiving. Accordingly, non-labor costs are assumed to be insignificant and are not included in any cost factors developed during this analysis.

As part of this study, we reviewed the Manpower Model used by the Air Force to develop bulk fuel processing manpower requirements. Our examination of the Manpower Model, leads us to the following conclusions:

- The model assumes that an Air Force Fuel Flight's normal hours of operation (for receiving and issuing) are 24 hours per day, 7 days per week. However, our site visits to six USAF bases revealed that bulk fuel

receiving normally occurs between 0800 and 1600 hours, Monday through Friday.

- Documentation provided does not explain the derivation of the regression equations employed in the model nor does it explain the source or derivation of the many variances applied by the model.
- The model does not distinguish between the functions of "receiving" and "issuing" fuel. However, the marginal effects of a change in "receiving" tasks can be evaluated and the model results appear to overstate bulk fuel receiving manpower requirements.

SECTION 6 RECOMMENDATIONS

6. RECOMMENDATIONS

a. The DFSC should selectively utilize the cost factors developed in this study as follows:

- in the evaluation of bids for the provision of bulk fuel to the nine installations included in this study.
- in the evaluation of bids for the provision of bulk fuel via pipeline or tank truck to any other installation (not included in this study) where it is known that there are no unusual or unique bulk fuel receipt policies, procedures or facilities that would indicate that these study findings would not apply.
- in any negotiation of compensation which may occur as the result of changing the primary mode of receipt at any of the nine installations included in this study.
- in any negotiation of compensation which may occur as the result of changing the primary mode of receipt from pipeline to tank truck at any other installation (not included in this study) where it is known that there are no unusual or unique bulk fuel receipt policies, procedures or facilities that would indicate that these study findings would not apply.

Caution should be exercised in applying these study results to other military installations without first obtaining a description of the policies, procedures and facilities employed for bulk fuel receiving. The limited number of installations sampled and the sample variance observed means that we can only be 50% confident that the actual added cost to change from pipeline to tank truck is no more than 25% above (or below) the average we observed (100 mils). Additionally, the findings pertaining to rail car and barge receipt should not be projected to other sites since so few installations with these modes of receipt were included in our sample.

b. The DFSC should study the bulk fuel receiving operations of other military installations in order to decrease sample variance and improve the level of statistical confidence in study findings.

c. The DFSC should update the data base developed for this study no less than every two years. The preferable method for updating this data base is a

telephone survey of each military installation. At a minimum, cost of living adjustments should be applied to the cost factors.

d. The DFSC should not compensate the USAF for additional manpower receiving costs (resulting from a change in primary receipt mode) on the basis of requirements produced by the USAF Manpower Model. This model appears to overstate bulk fuel receiving manpower requirements. The USAF should review the model with particular attention to Variance 3.

e. Military installations with unusually high bulk fuel receiving costs should consider facilities improvement projects and/or business process reengineering efforts to reduce costs.

APPENDIX A
SUMMARY OF SITE VISITS

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Appendix A

Summary of Site Visits

<u>Installation Location</u>	<u>Receipt Mode(s)</u>	<u>Fuel Type</u>	<u>Point of Contact</u>	<u>Dates of Visit</u>	<u>Comments</u>
NAS Cecil Field, FL	Pipeline Tank Truck	JP5	Mr. J. Martin	5-6 Mar 96	Receive pipeline from NAS Jacksonville, 19 miles away.
NAS Lemoore, CA	Pipeline Tank Truck	JP5	Mr. D. Cotta	26-27 Mar 96	Have begun to receive more via truck due to small business contract.
NAS Dallas, TX	Tank Truck Rail Car	JP8	ABFC King	9-10 Apr 96	Contractor-operated bulk fuel activity.
Eglin AFB, FL	Tank Truck Barge	JP8	SMSgt Carter	23-24 Apr 96	Supplies the 33rd Fighter Sq and Air National Guard unit.
Ellsworth AFB, SD	Pipeline Tank Truck Rail Car	JP8	Capt Schultz	8-9 May 96	Preferred receipt mode changes with season: winter-pipeline summer-truck.
Tinker AFB, OK	Pipeline Tank Truck	JP5 & JP8	Mr. R. Gilreath	21-22 May 96	Receives product faster by truck due to small pipeline.
McConnell AFB, KS	Pipeline Tank Truck	JP8	SMSgt Hungria	23-24 May 96	Will soon replace off-loading headers for trucks. During construction will rely totally on pipeline
Pope AFB, NC	Rail Car Tank Truck	JP8	Mr. K. Kirbow	30-31 July 96	Approx. 100 rail cars dedicated to Pope; there is virtually no limit on how long Pope can keep a car.

Seymour Johnson
AFB, NC

Pipeline
Tank Truck

JP8

Lt. S. Wier

1- 2 Aug 96

Tank truck
receipt costs are
based on
capability after
approved
MILCON
project is
completed.

APPENDIX B
SUMMARY OF INSTALLATION DESTINATION UNLOADING TASKS, TIMES
AND COSTS

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APPENDIX B

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

ANALYSIS OF WEEKLY BULK FUEL RECEIPTS TASK TIMES AND COSTS FOR

CECIL NAS

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	320	\$112.20	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	120	\$42.08	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT	N/A	N/A	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	200	\$70.12	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	240	\$84.16	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	400	\$140.24	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	N/A	N/A	SAFETY ²	N/A	N/A
SUPERVISION	600	\$261.16	SUPERVISION	N/A	N/A
OTHER ³	560	\$196.36	OTHER ³	N/A	N/A
TOTAL	2440	\$906.32	TOTAL	0	\$0.00
TOTAL GALLONS	960,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0009	LABOR COST PER GALLON		0

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	400	\$140.24	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	960	\$336.64	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT	1200	\$420.76	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	272	\$95.36	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	256	\$89.76	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	1200	\$420.76	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	N/A	N/A	SAFETY ²	N/A	N/A
SUPERVISION	720	\$313.40	SUPERVISION	N/A	N/A
OTHER ³	N/A	N/A	OTHER ³	N/A	N/A
TOTAL	5008	\$1,816.92	TOTAL	0	\$0.00
TOTAL GALLONS	960,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0019	LABOR COST PER GALLON		0

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² INCLUDES TASKS IDENTIFIED AS SAFETY OR MONITORING

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

SOURCE: DORO SITE VISIT, 5-6 MARCH 96

APPENDIX B

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

ANALYSIS OF WEEKLY BULK FUEL RECEIPTS TASK TIMES AND COSTS FOR

LEMOORE NAS

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	160	\$52.32	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	120	\$39.24	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT	N/A	N/A	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	160	\$52.32	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	880	\$287.68	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	280	\$87.24	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	N/A	N/A	SAFETY ²	N/A	N/A
SUPERVISION	1152	\$541.88	SUPERVISION	N/A	N/A
OTHER ³	80	\$26.16	OTHER ³	N/A	N/A
TOTAL	2832	\$1,086.84	TOTAL	0	\$0.00
TOTAL GALLONS	700,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0016	LABOR COST PER GALLON		0

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	160	\$47.12	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	880	\$259.16	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT	880	\$259.16	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	1040	\$306.28	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	1760	\$518.32	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	196	\$56.24	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	N/A	N/A	SAFETY ²	N/A	N/A
SUPERVISION	1152	\$541.88	SUPERVISION	N/A	N/A
OTHER ³	N/A	N/A	OTHER ³	N/A	N/A
TOTAL	6068	\$1,988.16	TOTAL	0	\$0.00
TOTAL GALLONS	700,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0028	LABOR COST PER GALLON		0

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² INCLUDES TASKS IDENTIFIED AS SAFETY OR MONITORING

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

SOURCE: DORO SITE VISIT 26-27 MARCH 96

**APPENDIX B
(Cont)**

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

**ANALYSIS OF WEEKLY BULK FUEL RECEIPTS
TASK TIMES AND COSTS
FOR**

DALLAS NAS

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	N/A	N/A	SOUNDING/GUAGING	200	\$60.00
INSPECTIONS	N/A	N/A	INSPECTIONS	20	\$6.00
HOOKUP & DISCONNECT	N/A	N/A	HOOKUP & DISCONNECT	10	\$3.00
VALVE & PUMP OPERATIONS	N/A	N/A	VALVE & PUMP OPERATIONS	25	\$7.50
SAMPLING & LAB WORK	N/A	N/A	SAMPLING & LAB WORK	165	\$48.75
BOOKKEEPING ¹	N/A	N/A	BOOKKEEPING ¹	25	\$7.40
SAFETY ²	N/A	N/A	SAFETY ²	N/A	N/A
SUPERVISION	N/A	N/A	SUPERVISION	290	\$88.75
OTHER ³	N/A	N/A	OTHER ³	N/A	N/A
TOTAL	0	\$0.00	TOTAL	735	\$221.40
TOTAL GALLONS	0		TOTAL GALLONS	200,000	
LABOR COST PER GALLON		0	LABOR COST PER GALLON		\$0.0011

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	200	\$60.00	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	175	\$52.50	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT	125	\$37.50	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	55	\$16.50	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	170	\$51.00	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	62.5	\$18.55	BOOKKEEPING ¹	N/A	N/A
SAFETY ²			SAFETY ²	N/A	N/A
SUPERVISION	290	\$88.75	SUPERVISION	N/A	N/A
OTHER ³	N/A	N/A	OTHER ³	N/A	N/A
TOTAL	1078	\$324.80	TOTAL	0	\$0.00
TOTAL GALLONS	200,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0016	LABOR COST PER GALLON		0

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² INCLUDES TASKS IDENTIFIED AS SAFETY OR MONITORING

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

SOURCE: DORO SITE VISIT, 9-10 APRIL 96

**APPENDIX B
(Cont)**

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

**ANALYSIS OF WEEKLY BULK FUEL RECEIPTS
TASK TIMES AND COSTS
FOR**

EGLIN AFB

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GAUGING	N/A	N/A	SOUNDING/GAUGING	N/A	N/A
INSPECTIONS	N/A	N/A	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT	N/A	N/A	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	N/A	N/A	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	N/A	N/A	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	N/A	N/A	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	N/A	N/A	SAFETY ²	N/A	N/A
SUPERVISION	N/A	N/A	SUPERVISION	N/A	N/A
OTHER ³	N/A	N/A	OTHER ³	N/A	N/A
TOTAL	\$0.00	\$0.00	TOTAL	\$0.00	\$0.00
TOTAL GALLONS	0		TOTAL GALLONS	0	
LABOR COST PER GALLON		0	LABOR COST PER GALLON		0

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GAUGING	160	\$51.20	SOUNDING/GAUGING	104	\$33.28
INSPECTIONS	882	\$282.24	INSPECTIONS	N/A	
HOOKUP & DISCONNECT	N/A		HOOKUP & DISCONNECT	N/A	
VALVE & PUMP OPERATIONS	196	\$62.72	VALVE & PUMP OPERATIONS	N/A	
SAMPLING & LAB WORK	813	\$333.33	SAMPLING & LAB WORK	70	\$22.40
BOOKKEEPING ¹	460	\$147.20	BOOKKEEPING ¹	200	\$64.00
SAFETY ²	430	\$176.30	SAFETY ²	N/A	
SUPERVISION	500	\$205.00	SUPERVISION	480	\$196.80
OTHER ³	N/A		OTHER ^{3,4}	232	\$74.24
TOTAL	3441	\$1,257.99	TOTAL	1086	\$390.72
TOTAL GALLONS	830,000		TOTAL GALLONS	830,000	
LABOR COST PER GALLON		\$0.0015	LABOR COST PER GALLON		\$0.0005

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² INCLUDES TASKS IDENTIFIED AS SAFETY OR MONITORING

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

⁴ INCLUDES SUCH TASKS AS GANG PLANK ENTRY, CLEANING BOAT, SPILL CONTAINMENT, AND LAUNCH/RETURN BOAT

SOURCE: DORO SITE VISIT 23-24 APRIL 96

**APPENDIX B
(Cont)**

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

**ANALYSIS OF WEEKLY BULK FUEL RECEIPTS
TASK TIMES AND COSTS
FOR**

ELLSWORTH AFB

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	70	\$24.50	SOUNDING/GUAGING	80	\$28.00
INSPECTIONS			INSPECTIONS	300	\$87.00
HOOKUP & DISCONNECT			HOOKUP & DISCONNECT	120	\$34.80
VALVE & PUMP OPERATIONS	35	\$10.15	VALVE & PUMP OPERATIONS	1360	\$476.00
SAMPLING & LAB WORK	306	\$88.74	SAMPLING & LAB WORK	610	\$176.90
BOOKKEEPING ¹	2	\$0.58	BOOKKEEPING ¹	120	\$34.80
SAFETY ²	1350	\$391.50	SAFETY ²		
SUPERVISION	660	\$310.20	SUPERVISION	1800	\$846.00
OTHER ³	42	\$12.18	OTHER ³	75	\$26.25
TOTAL	2465	\$837.85	TOTAL	4465	\$1,709.75
TOTAL GALLONS	600,000		TOTAL GALLONS	600,000	
LABOR COST PER GALLON		\$0.0014	LABOR COST PER GALLON		\$0.0028

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	80	\$28.00	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	480	\$139.20	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT	840	\$243.60	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	1920	\$556.80	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	610	\$176.90	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	120	\$34.80	BOOKKEEPING ¹	N/A	N/A
SAFETY ²			SAFETY ²	N/A	N/A
SUPERVISION	1800	\$846.00	SUPERVISION	N/A	N/A
OTHER ³	75	N/A	OTHER ³	N/A	N/A
TOTAL	5925	\$2,025.30	TOTAL	0	\$0.00
TOTAL GALLONS	600,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0034	LABOR COST PER GALLON		0

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² SAFETY TIME IS COMBINED WITH THE SPECIFIC TASKS.

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

SOURCE: DORO SITE VISIT, 8-9 MAY 96

**APPENDIX B
(Cont)**

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

**ANALYSIS OF WEEKLY BULK FUEL RECEIPTS
TASK TIMES AND COSTS
FOR**

TINKER AFB

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	450	\$130.50	SOUNDING/GUAGING	NA	NA
INSPECTIONS	1200	\$348.00	INSPECTIONS	NA	NA
HOOKUP & DISCONNECT	N/A	N/A	HOOKUP & DISCONNECT	NA	NA
VALVE & PUMP OPERATIONS	85	\$24.65	VALVE & PUMP OPERATIONS	NA	NA
SAMPLING & LAB WORK	812.5	\$235.63	SAMPLING & LAB WORK	NA	NA
BOOKKEEPING ¹	100	\$29.00	BOOKKEEPING ¹	NA	NA
SAFETY ²	1582.5	\$458.93	SAFETY ²	N/A	N/A
SUPERVISION	225	\$94.50	SUPERVISION	NA	NA
OTHER ³	30	\$8.70	OTHER ³	N/A	N/A
TOTAL	4485	\$1,329.90	TOTAL	0	\$0.00
TOTAL GALLONS	630,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0021	LABOR COST PER GALLON		0

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	480	\$139.20	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	800	\$232.00	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT*	N/A	N/A	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	160	\$46.40	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	720	\$208.80	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	280	\$81.20	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	544	\$157.76	SAFETY ²	N/A	N/A
SUPERVISION	120	\$50.40	SUPERVISION	N/A	N/A
OTHER ³	16	\$4.64	OTHER ³	N/A	N/A
TOTAL	3120	\$920.40	TOTAL	0	\$0.00
TOTAL GALLONS	630,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0015	LABOR COST PER GALLON		0

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² INCLUDES TASKS IDENTIFIED AS SAFETY OR MONITORING

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

* HOOKUP/DISCONNECT PERFORMED BY TRUCK DRIVER.

SOURCE: DORO SITE VISIT, 21-22 MAY 96

**APPENDIX B
(Cont)**

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

**ANALYSIS OF WEEKLY BULK FUEL RECEIPTS
TASK TIMES AND COSTS
FOR**

McCONNELL AFB

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	160	\$56.00	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	230	\$80.50	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT*	N/A	N/A	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	24	\$8.40	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	583	\$204.05	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	122	\$50.02	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	N/A	N/A	SAFETY ²	N/A	N/A
SUPERVISION	150	\$70.50	SUPERVISION	N/A	N/A
OTHER ³	30	\$10.50	OTHER ³	N/A	N/A
TOTAL	1299	\$479.97	TOTAL	0	\$0.00
TOTAL GALLONS	588,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0008	LABOR COST PER GALLON		0

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GUAGING	60	\$21.00	SOUNDING/GUAGING	N/A	N/A
INSPECTIONS	800	\$280.00	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT*	N/A	N/A	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	320	\$112.00	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	435	\$152.25	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	600	\$246.00	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	90	\$31.50	SAFETY ²	N/A	N/A
SUPERVISION	607.5	\$285.53	SUPERVISION	N/A	N/A
OTHER ³	400	\$140.00	OTHER ³	N/A	N/A
TOTAL	3312.5	\$1,268.28	TOTAL	0	\$0.00
TOTAL GALLONS	588,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0022	LABOR COST PER GALLON		0

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² SAFETY TIME COMBINED WITH OTHER TASKS

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

* HOOKUP/DISCONNECT PERFORMED BY TRUCK DRIVER

SOURCE: DORO SITE VISIT, 23-24 MAY, 96

**APPENDIX B
(Cont)**

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

**ANALYSIS OF WEEKLY BULK FUEL RECEIPTS
TASK TIMES AND COSTS
FOR**

POPE AFB

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GAUGING	N/A	N/A	SOUNDING/GAUGING	180	\$62.82
INSPECTIONS	N/A	N/A	INSPECTIONS	420	\$146.58
HOOKUP & DISCONNECT*	N/A	N/A	HOOKUP & DISCONNECT	420	\$146.58
VALVE & PUMP OPERATIONS	N/A	N/A	VALVE & PUMP OPERATIONS	120	\$41.88
SAMPLING & LAB WORK	N/A	N/A	SAMPLING & LAB WORK	390	\$136.11
BOOKKEEPING ¹	N/A	N/A	BOOKKEEPING ¹	105	\$36.65
SAFETY ²	N/A	N/A	SAFETY ²	105	\$36.65
SUPERVISION	N/A	N/A	SUPERVISION	270	\$111.65
OTHER ³	N/A	N/A	OTHER ³		
TOTAL	0	\$0.00	TOTAL	2010	\$718.91
TOTAL GALLONS	0		TOTAL GALLONS	840000	
LABOR COST PER GALLON		0	LABOR COST PER GALLON		\$0.0009

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GAUGING	180	\$62.82	SOUNDING/GAUGING	N/A	N/A
INSPECTIONS	1575	\$549.68	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT*	N/A	N/A	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	630	\$219.87	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	390	\$136.11	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	735	\$256.52	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	2160	\$753.84	SAFETY ²	N/A	N/A
SUPERVISION	180	\$74.43	SUPERVISION	N/A	N/A
OTHER ³			OTHER ³	N/A	N/A
TOTAL	5850	\$2,053.26	TOTAL	0	\$0.00
TOTAL GALLONS	840,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0024	LABOR COST PER GALLON		0

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² SAFETY TIME COMBINED WITH OTHER TASKS

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

* HOOKUP/DISCONNECT PERFORMED BY CARRIER

SOURCE: DORO SITE VISIT, 30-31 JULY, 96

**APPENDIX B
(Cont)**

DFSC BID EVALUATION MODEL PROJECT

PROJECT: DLA-XX-P60110

**ANALYSIS OF WEEKLY BULK FUEL RECEIPTS
TASK TIMES AND COSTS
FOR**

SEYMOUR JOHNSON AFB

PIPELINE			RAIL CAR		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GAUGING	192	\$55.55	SOUNDING/GAUGING	N/A	N/A
INSPECTIONS	192	\$55.55	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT*	N/A	N/A	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	32	\$9.26	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	928	\$323.87	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	240	\$83.76	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	960	\$277.76	SAFETY ²	N/A	N/A
SUPERVISION	96	\$39.70	SUPERVISION	N/A	N/A
OTHER ³	6.4	\$1.85	OTHER ³	N/A	N/A
TOTAL	2646	\$847.30	TOTAL	0	\$0.00
TOTAL GALLONS	880,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0010	LABOR COST PER GALLON		0

TANK TRUCK			BARGE		
TASK	TOTAL MINUTES	TOTAL LABOR COST	TASK	TOTAL MINUTES	TOTAL LABOR COST
SOUNDING/GAUGING	264	\$76.38	SOUNDING/GAUGING	N/A	N/A
INSPECTIONS	110	\$31.83	INSPECTIONS	N/A	N/A
HOOKUP & DISCONNECT	1100	\$318.26	HOOKUP & DISCONNECT	N/A	N/A
VALVE & PUMP OPERATIONS	1188	\$343.72	VALVE & PUMP OPERATIONS	N/A	N/A
SAMPLING & LAB WORK	636.24	\$222.05	SAMPLING & LAB WORK	N/A	N/A
BOOKKEEPING ¹	880	\$307.12	BOOKKEEPING ¹	N/A	N/A
SAFETY ²	1320	\$381.92	SAFETY ²	N/A	N/A
SUPERVISION	660	\$272.91	SUPERVISION	N/A	N/A
OTHER ³	22	\$7.68	OTHER ³	N/A	N/A
TOTAL	6180	\$1,961.87	TOTAL	0	\$0.00
TOTAL GALLONS	880,000		TOTAL GALLONS	0	
LABOR COST PER GALLON		\$0.0022	LABOR COST PER GALLON		0

¹ INCLUDES BOTH DFAMS AND LOG RECORD

² SAFETY TIME COMBINED WITH OTHER TASKS

³ INCLUDES SUCH TASKS AS LINE RIDING, COMMUNICATIONS, ESCORTING AND MARSHALLING

SOURCE: DORO SITE VISIT, 1-2 AUG, 96

APPENDIX C
INSTALLATION COST PER GALLON, TOTAL GALLONS PER WEEK
AND
TOTAL COST PER WEEK

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APPENDIX C

COST PER GALLON, TOTAL GALLONS AND TOTAL COST BY INSTALLATION

COST PER GALLON

	CECIL NAS	LEMOORE NAS	DALLAS NAS	NAVY TOTALS	EGLIN AFB	ELLSWORTH AFB	TINKER AFB	McCONNELL AFB	POPE AFB	SEYM JOHNS AFB	AIR FORCE TOTALS	GRAND TOTALS
PIPELINE	\$ 0.0009	\$ 0.0016	0	0.0012	0	\$ 0.0014	\$ 0.0021	\$ 0.0008	0	\$ 0.0010	0.0013	\$ 0.0013
TANK TRUCK	\$ 0.0019	\$ 0.0028	\$ 0.0016	0.0022	\$ 0.0015	\$ 0.0034	\$ 0.0015	\$ 0.0022	\$ 0.0024	\$ 0.0022	0.0022	\$ 0.0022
RAIL CAR	0	0	\$ 0.0011	0.0011	0	\$ 0.0028	0	0	\$ 0.0009	0	0.0017	\$ 0.0016
BARGE	0	0	0	0	\$ 0.0005	0	0	0	0	0	0.0005	\$ 0.0005

SOURCE: DORO SITE VISITS, MAY-AUGUST 1996

**APPENDIX C
(Cont)**

**COST PER GALLON, TOTAL GALLONS AND TOTAL COST
BY INSTALLATION**

GALLONS UTILIZED ON A WEEKLY BASIS

	CECIL NAS	LEMOORE NAS	DALLAS NAS	NAVY TOTALS	EGLIN AFB	ELLSWORTH AFB	TINKER AFB	McCONNELL AFB	POPE AFB	SEYM JOHNS AFB	AIR FORCE TOTALS	GRAND TOTALS
PIPELINE	960000	700000	0	1660000	0	600000	630000	588000	0	880000	2698000	4358000
TANK TRUCK	960000	700000	200000	1860000	830000	600000	630000	588000	840000	880000	4368000	6228000
RAIL CAR	0	0	200000	200000	0	600000	0	0	840000	0	1440000	1640000
BARGE	0	0	0	0	830000	0	0	0	0	0	830000	830000

SOURCE: DORO SITE VISITS, MAY-AUGUST 1996

**APPENDIX C
(Cont)**

**COST PER GALLON, TOTAL GALLONS AND TOTAL COST
BY INSTALLATION**

TOTAL COST ON A WEEKLY BASIS

	CECIL NAS	LEMOORE NAS	DALLAS NAS	NAVY TOTALS	EGLIN AFB	ELLSWORTH AFB	TINKER AFB	McCONNELL AFB	POPE AFB	SEYM JOHNS AFB	AIR FORCE TOTALS	GRAND TOTALS
PIPELINE	\$ 906.32	\$1,086.84	\$0.00	\$1,993.16	\$0.00	\$837.85	\$1,329.90	\$479.97	\$0.00	\$847.30	\$3,495.02	\$5,488.18
TANK TRUCK	\$1,816.92	\$1,988.16	\$324.80	\$4,129.88	\$1,257.99	\$2,025.30	\$920.40	\$1,268.28	\$2,053.26	\$1,961.87	\$9,487.09	\$13,616.97
RAIL CAR	\$0.00	\$0.00	\$221.40	\$ 221.40	\$0.00	\$1,709.75	\$0.00	\$0.00	\$718.91	\$0.00	\$2,428.66	\$2,650.06
BARGE	\$0.00	\$0.00	\$0.00	\$0.00	\$390.72	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$ 390.72	\$390.72

SOURCE: DORO SITE VISITS, MAY-AUGUST 1996

APPENDIX D
Statistical Analysis of Sample Data

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Appendix D

Statistical Analysis of Sample Data

CONFIDENCE LEVELS

If the results of this analysis are to be used to estimate the destination unloading costs at bases not visited in the scope of this study, sampling risk must be considered. Given the small sample of bases visited and the variance in results observed between bases, a measure of confidence in projecting sample results to a population of bases was calculated. The method of calculating confidence was to assume that the difference between pipeline and tank truck costs follows the normal distribution for the population of all bases. A confidence interval using the Student-t distribution can then be used as follows:

$$\bar{x} - t_{\alpha/2, n-1} s/\sqrt{n} < \mu < \bar{x} + t_{\alpha/2, n-1} s/\sqrt{n} \text{ where:}$$

\bar{x} is the sample mean of the difference between pipeline and truck cost per gallon

s is the sample standard deviation

n is the sample size

α is the confidence level

μ is the population mean

Setting a desired level of precision at $\pm 25\%$, a confidence level can be calculated as shown in the table below.

The average difference in the sample was 100 mils per gallon (or \$.00100). With a standard deviation of 90 mils and a sample size of 6, the corresponding confidence is about 50%. In other words, we are approximately 50% confident that the true population mean is between 75 and 125 mils per gallon.

Installation	Delta: Truck Cost Minus Pipeline Cost
CECIL	0.0010
LEMOORE	0.0012
ELLSWORTH	0.0020
TINKER	-0.0006
SEYM JOHNS	0.0012
MCCONNELL	0.0014
avg	0.00100
std dev	0.00090
tolerance	0.00025
n- sample size	6
t value	0.72649155
t table value ($\alpha/2$)	25%
confidence	50%

APPENDIX E
NON-LABOR DESTINATION UNLOADING COSTS _

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Appendix E
Non-Labor Destination Unloading Costs

<u>Reported By</u>	<u>Type of Cost</u>	<u>Receipt Mode</u>	<u>Cost</u>
Tinker AFB	Replacement of Separator Elements	Tank Truck	\$ 13,600/yr
LeMoore NAS	Electricity for off-loading pumps	Tank Truck	\$ 1.14 /day
McConnell AFB	Electricity for off-loading pumps	Tank Truck	\$ 217.50 /yr
McConnell AFB	Replace Hoses-offloading pumps	Tank Truck	\$ 197.16 /yr
McConnell AFB	Maintenance for off-loading headers	Tank Truck	\$ 9289.08 /yr
Seymour Johnson AFB	Laboratory Supply Costs	Pipeline or Tank Truck	\$ 120.67 /mo
Seymour Johnson AFB	Replacement of Separator Elements	Tank Truck	\$ 720.00 /yr
Seymour Johnson AFB	Pump Maintenance for off-loading headers	Tank Truck	\$ 480.00 /mo

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